

Preface

This report is one of a series of operations reports written for the United States National Science Foundation (NSF) Office of Polar Programs, Ultraviolet Spectroradiometer Network, now in its 17th year of operation. The report is intended to complement Volume 13.0 network data that have been measured in 2003 and 2004. Like the Operations Reports of Volume 7 – 12, this report is also made available in pdf-format on the project's website at www.biospherical.com/NSF.

The Antarctic “ozone hole” in the austral fall of 2003 was one of the largest on record; its size peaked at about 28 million square kilometers in September. This is in stark contrast to the situation in 2002 when the maximum size was only 19 million km². Despite the large size in September, the ozone depleted area decreased faster than in many of the previous years. UV levels between October and December 2003 observed at Antarctic network sites were equal or smaller than the long-term average, with few exceptions.

On 11/23/03, a partial solar eclipse was visible in Antarctica. At South Pole, the moon started to block the Sun at 22:24 UT. The time of maximum eclipse was 23:18, when approximately 88% of the Sun was blocked. Radiation levels during this time were reduced by more than 90% compared to levels observed immediately before the start of the eclipse.

The San Diego area was affected by devastating wildfires in the fall of 2003. More than 400,000 acres burned in San Diego county in October and November, along with 2,400 homes. The aerosol layer above the instrument was so dense that it was possible to look into the Sun with the naked eye. The noon-time UV Index on 10/26/03 was about 0.0005; which is four orders of magnitude lower than the UV Index measured prior to the fire. See Section 7.5 for more details.

This volume is the second volume discussing data from GUV moderate-bandwidth, multi-channel radiometers, which were installed next to the SUV-100 spectroradiometers at several network sites during the reporting period. These instruments provide measurements at several approximately 10 nm wide wavelength bands in the UV. An additional channel measures Photosynthetically Active Radiation. Data from the GUV radiometers are made available in near real time at the project's web site and are also used for quality control of SUV-100 measurements.

The methods used for data processing of SUV-100 data were essentially the same as implemented for Volumes 7 – 12. In order to reduce the number of data media, measured solar spectra (“Composite Scans”) were compressed and are stored in zip-format on the Volume 13.0 CD-ROM.

We want to emphasize that a new data version of the entire data set of the NSF UV Monitoring network is currently being generated. This new data set is named “Version 2” and will eventually supersede the “Version 0” data set discussed in this report. Version 2 data are corrected for the instruments' cosine errors, wavelength errors, which mostly affected earlier network data, and step changes caused by modifications to the instruments. Version 2 data therefore have a higher accuracy than Version 0 data. They also feature a larger number of data products, such as total column ozone, effective albedo, and cloud optical depth. In addition, each measured UV spectrum is complemented with a model spectrum that has been calculated with a radiative transfer model. These model spectra are required for the various corrections and also serve as reference clear-sky spectra during cloudy conditions. More about the new Version 2 data set can be found at the Version 2 website at www.biospherical.com/NSF/Version2.

We would like to express our appreciation to all researchers that have utilized and published data from the NSF UV Network (see Appendix Section A2. “References”). We are always looking for publication references in which the network's data have been used. We are especially grateful to those who offered feedback on methods, algorithms, and data products. We continue to encourage this input and welcome suggestions on how we can further meet the needs of the scientific community. An easy-to-use feedback form can be found on the project's website at www.biospherical.com/NSF.

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Garry Harris from Research Instrument Systems was commissioned by NSF/OPP in the fall of 1987 to design and build the precursor to the SUV-100. Four instruments were manufactured between October 1987 and January 1988, and two were deployed at McMurdo Station and the South Pole in February 1988. In the original configuration no publishable data were produced by the two instruments, and both were substantially redesigned by Biospherical Instruments Inc during the following season.

Key Contributors

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Susana Díaz of CONICET manages Ushuaia's operation, with assistance of G. Deferrari. Dr. E. Olivero, the current director of CADIC, provides facilities and personnel support. Former director Dr. J. Rabassa made this installation possible.

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Personnel at Biospherical Instruments

The Principal Investigator for the project is C. R. ("Rocky") Booth, the Chief Executive Officer and Research Director of Biospherical Instruments Inc. The Co-Principal Investigator is Dr. Germar Bernhard, an Atmospheric Physicist and UV researcher who joined Biospherical Instruments Inc from the Fraunhofer Institute for Atmospheric Environmental Research (IFU) of Garmisch-Partenkirchen, Germany. He is responsible for quality control and scientific analysis of data from the network. The Project Manager is James ("Jim") C. Ebrahimian, and he is responsible for the project's operational activities. Vi Quang joined the group in 1999 as Data Analyst/Database Administrator performing data analysis, database development, programming, and website development.

